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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOSEPH PARKOS, JR.,
MICHAEL A. WEISSE, CHRISTOPHER S. MCKAVENEY,
JAMES R. MURDOCK, and SCOTT C. BILLINGS

Appeal 2015-004629
Application 13/324,169
Technology Center 3700

Before EDWARD A. BROWN, JAMES P. CALVE, and
ARTHUR M. PESLAK, *Administrative Patent Judges*.

CALVE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the final rejection of claims 1, 7–16, 19–21, and 25. Appeal Br. 4, 9. Claims 2–6, 17, 18, 22–24, and 26 have been canceled. *Id.* at 4, 15–17 (Claims Appendix). We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

CLAIMED SUBJECT MATTER

Claim 1, 10, and 14 are independent. Claim 1 is reproduced below.

1. A turbine engine component comprising:
 - an airfoil portion with a tip portion;
 - said tip portion having at least one chamfered edge on at least one side, wherein said tip portion has a first chamfered edge on a first side and a second chamfered edge on a second side opposed to said first side, said at least one chamfered edge having a radius;
 - a flattened tip portion extending between said first chamfered edge and said second chamfered edge; and
 - a tip treatment applied to said flattened tip portion.

REJECTIONS¹

Claims 1, 7–10, 12, 14–16, and 19–21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Freling (US 5,476,363, iss. Dec. 19, 1995) and Lee (US 6,086,328, iss. July 11, 2000).²

Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Freling, Lee, and Schilling (US 6,004,101, iss. Dec. 21, 1999).

Claims 13 and 25 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Freling, Lee, and Giusti (EP 1,908,919 A1, pub. Apr. 9, 2008).

¹ The Examiner withdrew the rejection of claim 10 under 35 U.S.C. § 112, fourth paragraph. Final Act. 4; Ans. 3.

² The Examiner rejected claim 22 on this ground (Final Act. 5). However, Appellants cancelled claim 22 in an amendment filed after the Final Action. *See* Response to Final Office Action, filed Sept. 2, 2014, at 5, 6. Therefore, the rejection of claim 22 on this ground is not before us.

ANALYSIS

Claims 1, 7–10, 12, 14–16, and 19–21 as unpatentable over Freling and Lee

The Examiner found that Freling teaches a turbine engine component and a method of creating such component as recited in independent claims 1, 10, and 14, except for the chamfered edge having a radius. Final Act. 5–6.

The Examiner found that Lee teaches alternative embodiments of an edge that is chamfered with a straight cut or a radius, as claimed. *Id.* at 6. The Examiner determined that it would have been obvious to modify the multiple cut or the angled cut taught by Freling to be a radius, as taught by Lee, to provide a chamfered edge with a slightly altered performance to the straight chamfer. *Id.* at 7.

Appellants argue that a skilled artisan would not have been motivated to combine the teachings of Freling and Lee as the Examiner does because Lee teaches away from the combination. Appeal Br. 11–12; Reply Br. 3–5. In particular, Appellants argue that Freling teaches a flat blade tip to support an abrasive coating, whereas Lee teaches blade tip 38 configured to reduce a surface area to reduce heating from combustion gases 12 and therefore also includes a top recess/slot 48 and tip holes 50 without any coating. Appeal Br. 11. Appellants also argue that a tip coating would render Lee completely inoperable. *Id.* at 12; Reply Br. 4.

Appellants' arguments are not persuasive for several reasons. First, the Examiner is not proposing to modify the turbine blade tip of Lee to include a coating as taught in Freling. Final Act. 5–6; Ans. 4. Therefore, Appellants' arguments that the proposed combination would render Lee inoperable is not persuasive as they do not address the rejection set forth in the Final Action.

Second, the Examiner proposes to modify the shape of chamfer 30 in Freling from a flat edge to an edge with a radius based on Lee's teaching of such curved side edges on turbine blades. Final Act. 6–7. The Examiner's proposal is supported by rational underpinnings at least because Lee teaches that such arcuate sides 52b, 54b, 52c, 54c (Figs. 6, 7) decrease the exposed surface area that is subject to combustion gas heating. Lee, 5:1–14.

The Examiner proposes to modify the shape of the chamfered sides of Freling's turbine blades to include a radius of curvature, as taught by Lee, to alter the performance of the blade slightly as compared to a straight chamfer. Final Act. 7. Lee teaches that such shapes "effectively reduce the external heating surface area of the blade tip." Lee, 5:15–17. A skilled artisan would have been motivated to provide such benefits for Freling's blades for use in turbine and compressor sections of gas turbine engines. *See* Freling, 1:8–24.

Appellants' arguments do not persuade us that a skilled artisan would have been discouraged from relying on Lee's teachings to change the shape of the chamfered sides of Freling for the reasons set forth in Lee. Contrary to Appellants' argument that Lee is concerned with reducing the surface area of the blade tip and Freling is not (Appeal Br. 11–12; Reply Br. 4), we find that Freling is directed to reducing the surface area that supports the blade coating via chamfering to reduce the stresses that occur at the outer edges of the blade. Freling, 4:10–23. Freling recognizes that tradeoffs exist between reducing stress concentration at the blade tip through chamfered sides while leaving sufficient tip surface to support a coating. *Id.* at 5:3–18. A skilled artisan could weigh the advantages and disadvantages of radii of different curvatures of the chamfered surface to reduce the heating of the tip and the tip stresses while also leaving sufficient tip surface to support a coating.

Thus, we sustain the rejection of independent claims 1, 10, and 14. Appellants do not present separate arguments for any of dependent claims 7–9, 12, 15, 16, or 19–21. *See* Appeal Br. 12. Thus, we sustain the rejection of those claims as well.

Rejections of claim 11, 13, and 25 over Freling, Lee, and Schilling/Giusti

The Examiner relied on Schilling to teach features of claim 11 and Giusti to teach features of claims 13 and 25. Final Act. 8–9. Appellants do not dispute the Examiner’s findings concerning claims 11, 13, and 25 based on Schilling/Giusti, but argue that Schilling and Giusti do not remedy the defects of Freling and Lee. *See* Appeal Br. 13–14. Because we sustain the rejection of claims 1, 10, and 14 as unpatentable over Freling and Lee, there are no deficiencies for Schilling or Giusti to cure. Thus, we also sustain the rejections of claims 11, 13, and 25, which depend from claims 10, 1, and 14, respectively.

DECISION

We affirm the rejections of claims 1, 7–16, 19–21, and 25.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED